



**BASIN ELECTRIC
POWER COOPERATIVE**

A Touchstone Energy® Cooperative 

Managing Drones

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Chief Pilot / UAS Program Manager

Managing Drones

- Why we started a drone program
- Who should run a drone program
- What does oversight actually look like
- Selecting the right drones
- What we are doing with drones at Basin Electric
- What others are doing with drones

What is a Drone?

What is a Drone?

- Drone
- Unmanned Aircraft (UA)
- Unmanned Aircraft System (UAS)
 - UA
 - Ground control station
 - Data link
 - Payload



Source: DJI. | www.gao.gov



Starting a Drone Program

Starting a Drone Program

- Put a project team together
 - Include potential remote pilots and those who would benefit from drones
- Collect information from other operators
 - Organization of their program
 - Documentation
 - Use cases

Starting a Drone Program

- Dedicated drone department
 - Includes full time drone pilots and support staff
 - Complete projects from conception to finished product
- Decentralized drone department
 - UAS Program Manager to oversee drone operations
 - Departments with business need operate drones
 - Drone team helps with one-off projects for other departments

Starting a Drone Program

- Challenges with a decentralized program
 - Remote pilot not always available when needed
 - Keeping remote pilots current



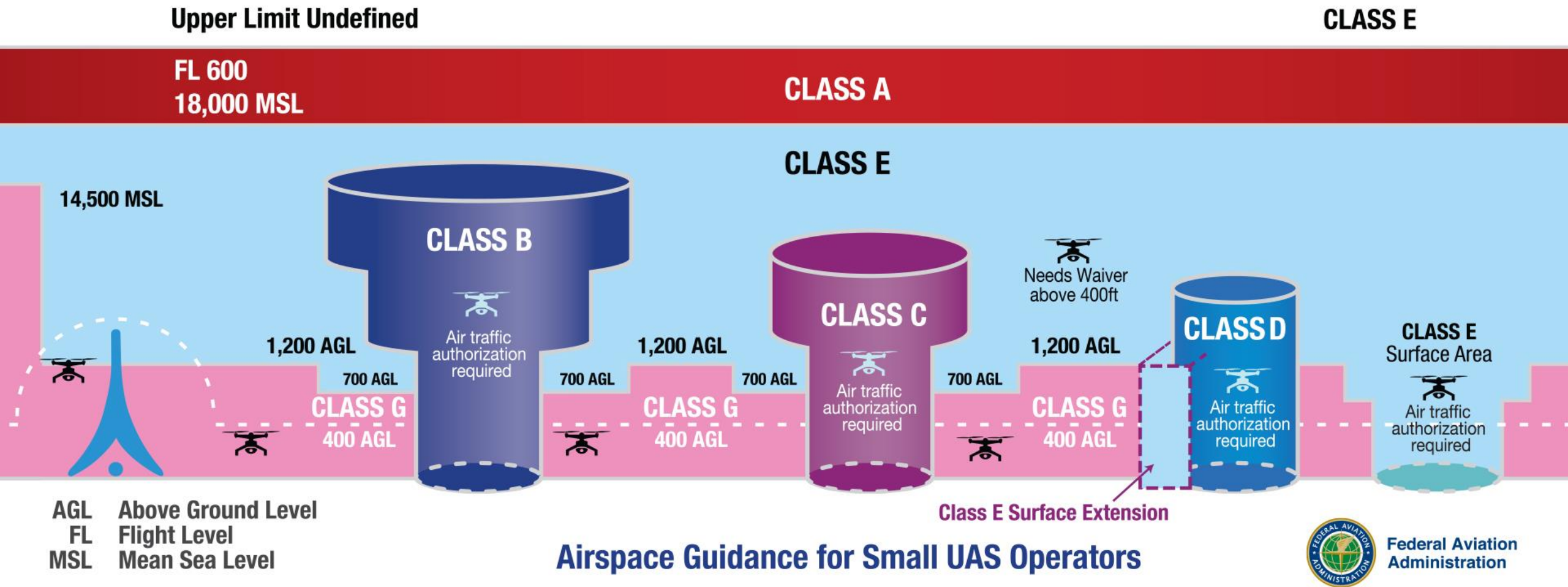
- Remember the main point is oversight
 - Structure can be adjusted as needed, get the oversight piece right

Who's in Charge?

Who's in Charge?

- If you have a manned aviation program, that's where your drone program should be housed
 - Drones are an aviation activity
 - There is a lot of aviation specific knowledge needed to fly drones safely and legally
 - FAA Regulations (Part 91, Part 107)
 - Airport operations and traffic patterns
 - Airspace

Airspace Classification



Who's in Charge?

- If you don't have a manned aviation program:
 - Find someone who has aviation knowledge or support someone in building aviation knowledge
 - Private pilot ground school and written exam at minimum
 - Beware of the drone enthusiast
 - Main role of a program manager is oversight, not necessarily flying


Oversight


Drone Program Oversight


- Who are your drone pilots
 - Part 107 certificate
- What drones do you have
 - FAA registered
 - Properly marked
- UAS Operations Policy Manual
 - Governing document for all UAS operations
- What are your pilots doing with drones
 - Tracking actual operations





Drone Program Oversight














Manage

Operations

Missions

Logs

Flights

Authorizations

Checklists

Risk Assessments

Maintenance

Incidents

Assets

Aircraft

Batteries

Procedures

Workflows

Checklists

Risk Assessments

Custom Airspace

Admin

Missions

+ ADD FILTER

CLEAR FILTERS

ADD MISSION

COLUMNS APPLY ACTION

DENSITY EXPORT

<input type="checkbox"/>	Mission Name	Status	Start Date	Pilot In Command	Crew	Risk Level	Airspace Type
<input type="checkbox"/>	WY, E&C, LRS Emergency Holding Pon...	Approved	01/31/2024 10:30 PM MST	Kohler, Robert	Kohler, Robert		Clear Airsp
<input type="checkbox"/>	WY, E&C, LRS Stockpile Surveys	Approved	01/31/2024 3:00 PM MST	Kohler, Robert	Kohler, Robert		Clear Airsp
<input type="checkbox"/>	WY, E&C, LRS Coal and Limestone Sur...	Approved	01/31/2024 7:32 AM MST	Kohler, Robert	Kohler, Robert		Clear Airsp
<input type="checkbox"/>	MT, MLC, Blast Profiling	Approved	01/25/2024 9:00 AM MST	Dow, Jacob	Dow, Jacob		Clear Airsp
<input type="checkbox"/>	ND, Comm, HDQ - Mavic 3 Pro Testing	Completed	01/12/2024 11:00 AM CST	Hardy, Michael	Hardy, Michael		Authorizati
<input type="checkbox"/>	ND Comm PGS workers	Completed	12/15/2023 12:32 PM CST	Wheeler, Gregory	Wheeler, Gregory	25%	Clear Airsp
<input type="checkbox"/>	ND Comm Wartsila PGS arrival	Completed	12/15/2023 12:04 PM CST	Wheeler, Gregory	Wheeler, Gregory	16%	Clear Airsp
<input type="checkbox"/>	ND Comm Wartsila Transport	Approved	12/14/2023 11:58 AM CST	Wheeler, Gregory	Wheeler, Gregory	13%	Clear Airsp
<input type="checkbox"/>	ND Comm DGC Pipeline	Completed	12/06/2023 1:42 PM CST	Wheeler, Gregory	Wheeler, Gregory	23%	Clear Airsp
<input type="checkbox"/>	ND Comm DGC Pipeline	Completed	12/06/2023 1:42 PM CST	Wheeler, Gregory	Wheeler, Gregory	23%	Clear Airsp
<input type="checkbox"/>	ND Comm Pioneer Station Aerials II	Completed	12/06/2023 9:21 AM CST	Wheeler, Gregory	Wheeler, Gregory	20%	Clear Airsp
<input type="checkbox"/>	ND Comm Pioneer Station Aerials	Completed	12/06/2023 9:04 AM CST	Wheeler, Gregory	Wheeler, Gregory	20%	Clear Airsp

Drone Program Oversight

- Don't forget about vendors and contractors
- Insurance
 - May need a separate aviation policy
 - Insurance requirements for vendors

Selecting the Right Drone

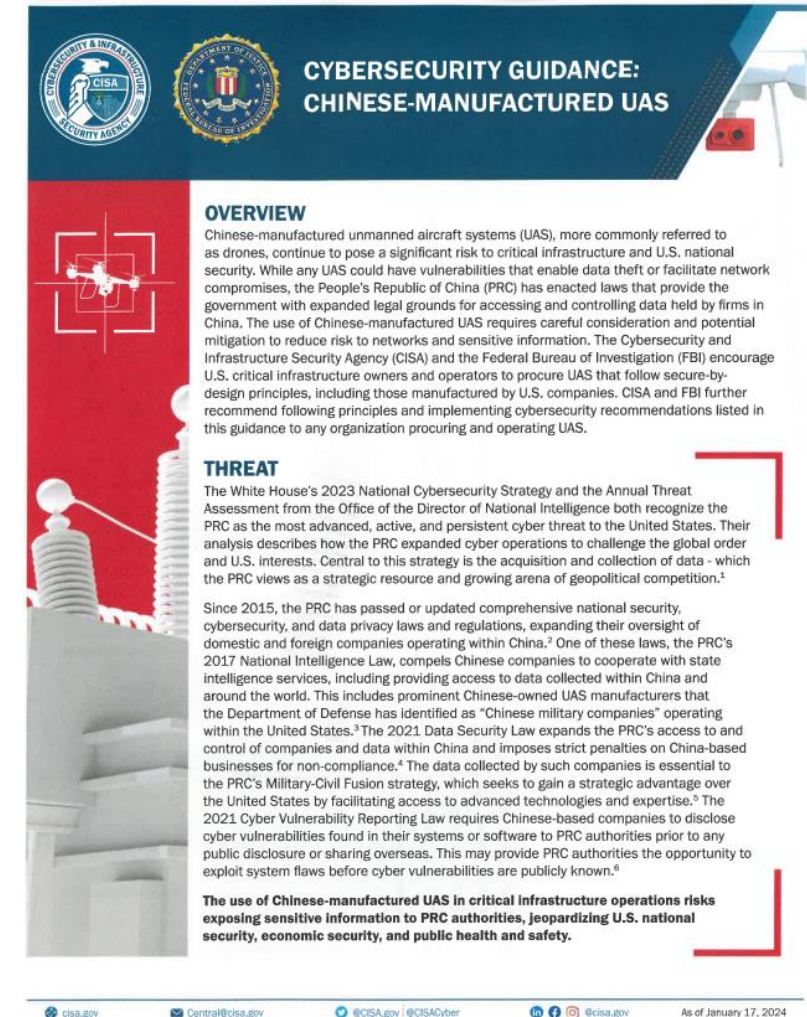
Selecting the Right Drone

- Experience verses need
 - May need to build experience before need develops
 - Don't want inexperienced drone pilots on complicated projects
- Don't always know what capabilities you need starting out
 - Start with a basic, but capable drone
 - Don't get enthralled with the greatest technology
- Drones are computers, they have a lifespan



Selecting the Right Drone

- To DJI or not to DJI
 - Current leader in drone industry
 - Cybersecurity Guidance (FBI & CISA)
 - National Defense Authorization Act of 2024
- Blue UAS Cleared List
 - Skydio, Flighwave, Harris Aerial, Easy Aerial, Inspired Flight, BlueHalo, Wintra, Ascent AeroSystems, senseFly, Freefly Systems



What are We Doing with Drones?

Flight Department

Dakota Gasification Company Critical Roof Inspections



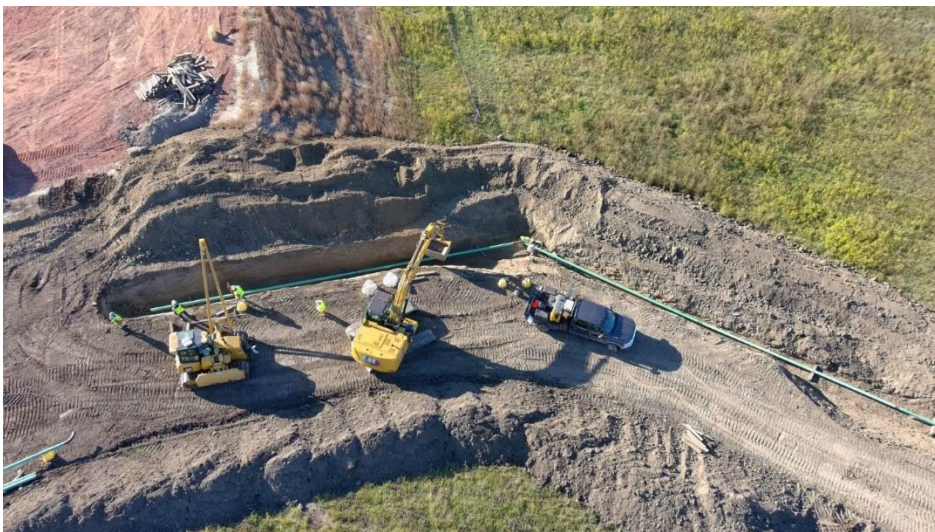


Flight Department

Leland Old Station Expansion Joint Inspection



Flight Department



Communications

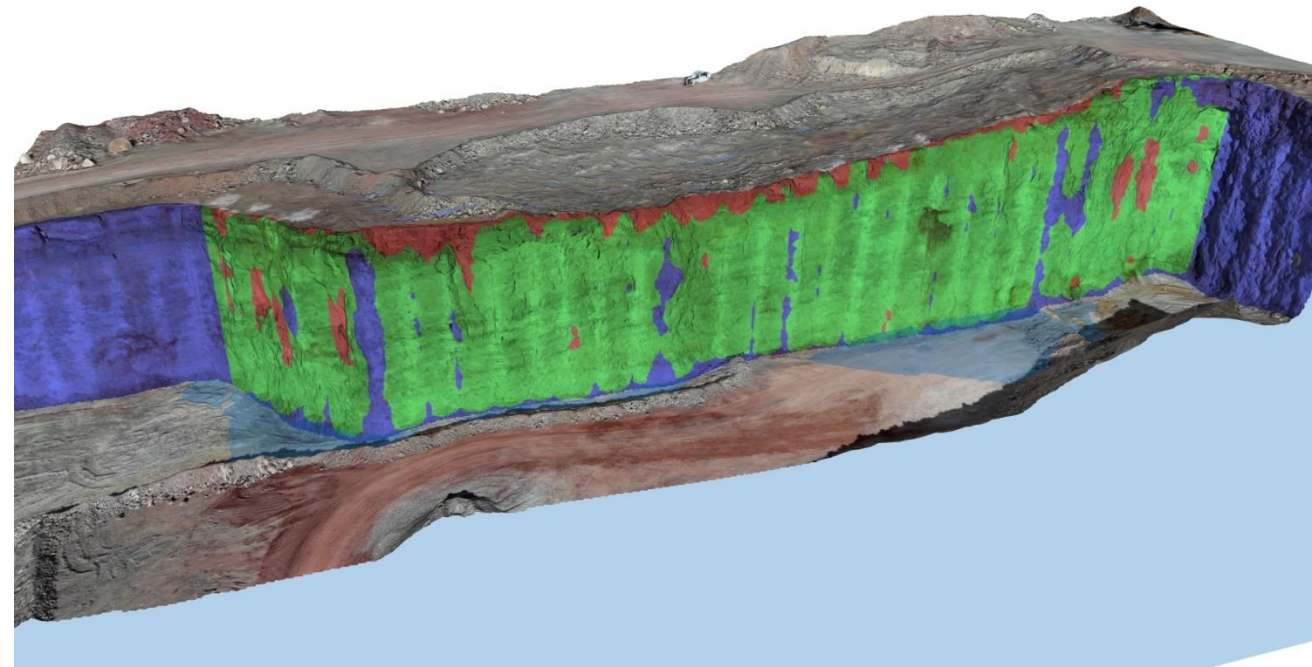
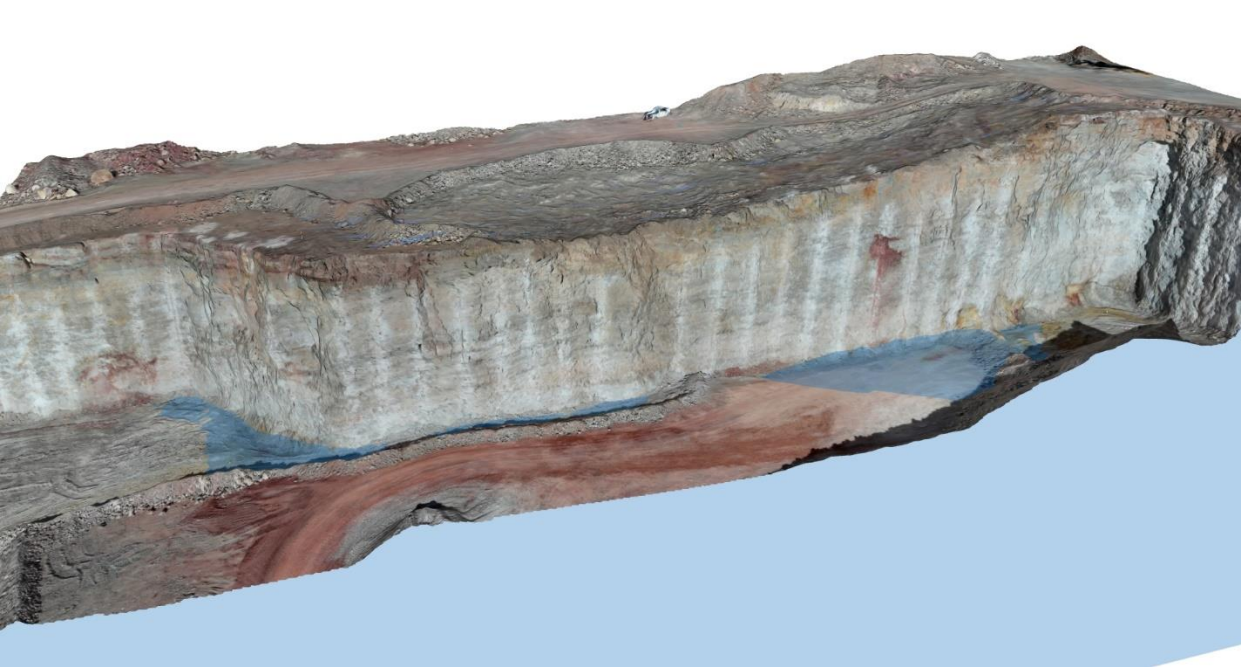


Communications



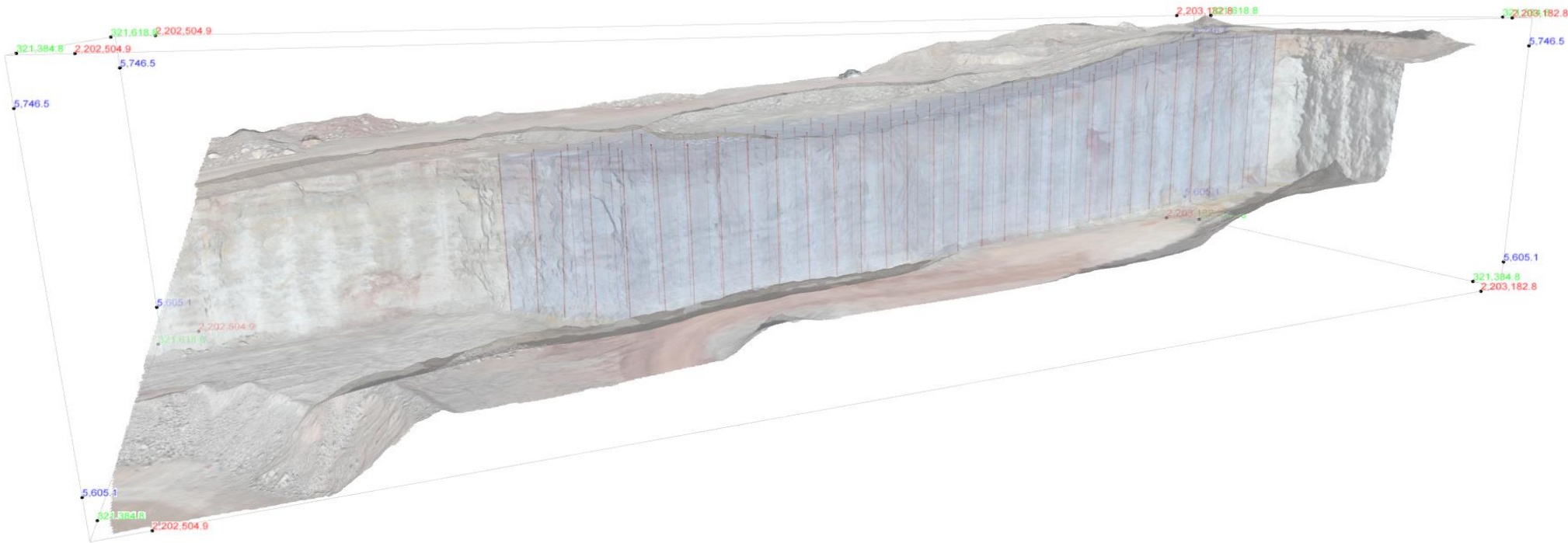
Dakota Coal Company

Montana Limestone Company
3D Blast Design Software



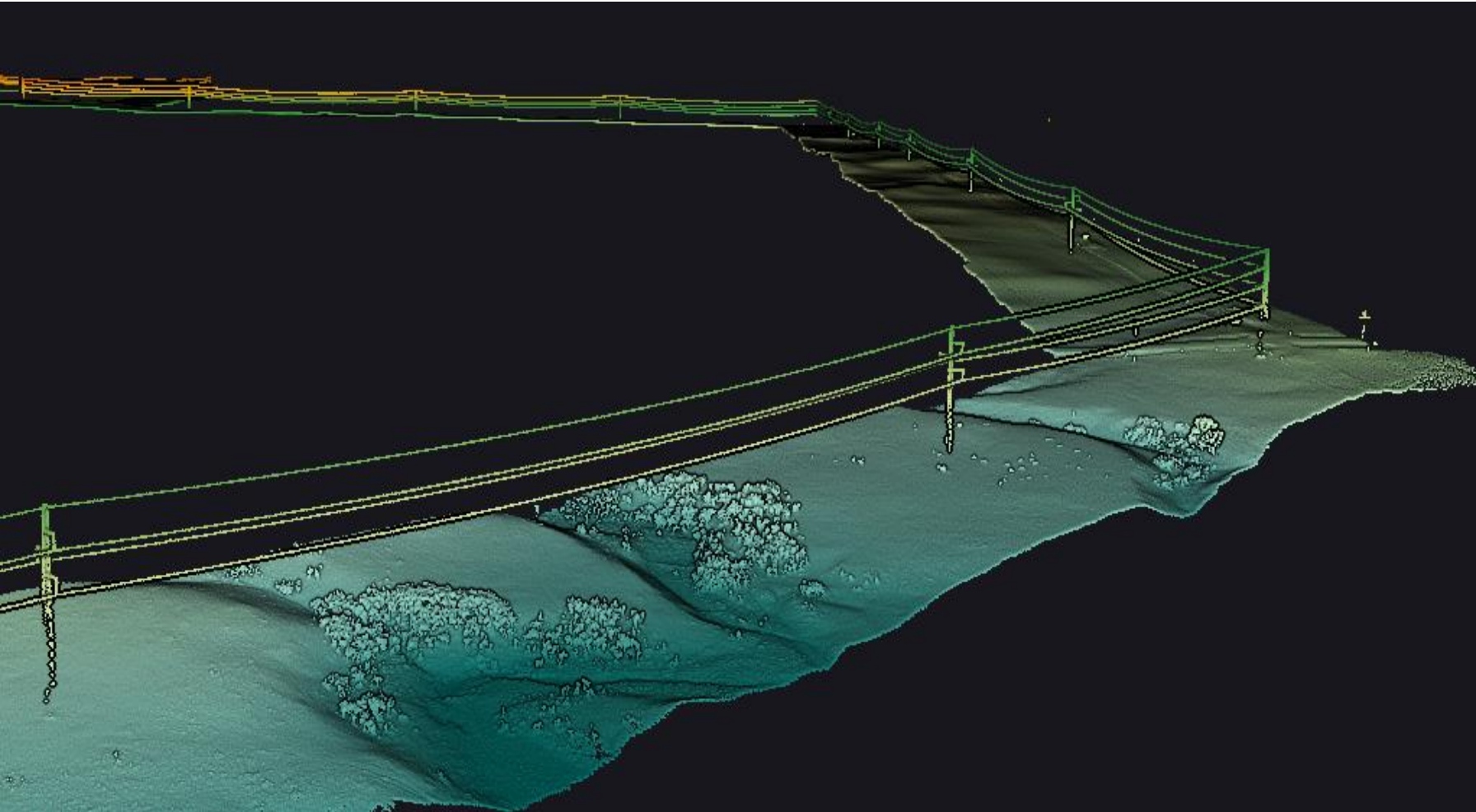
Dakota Coal Company

Montana Limestone Company 3D Blast Design Software





Engineering Department



Topographic Surveys

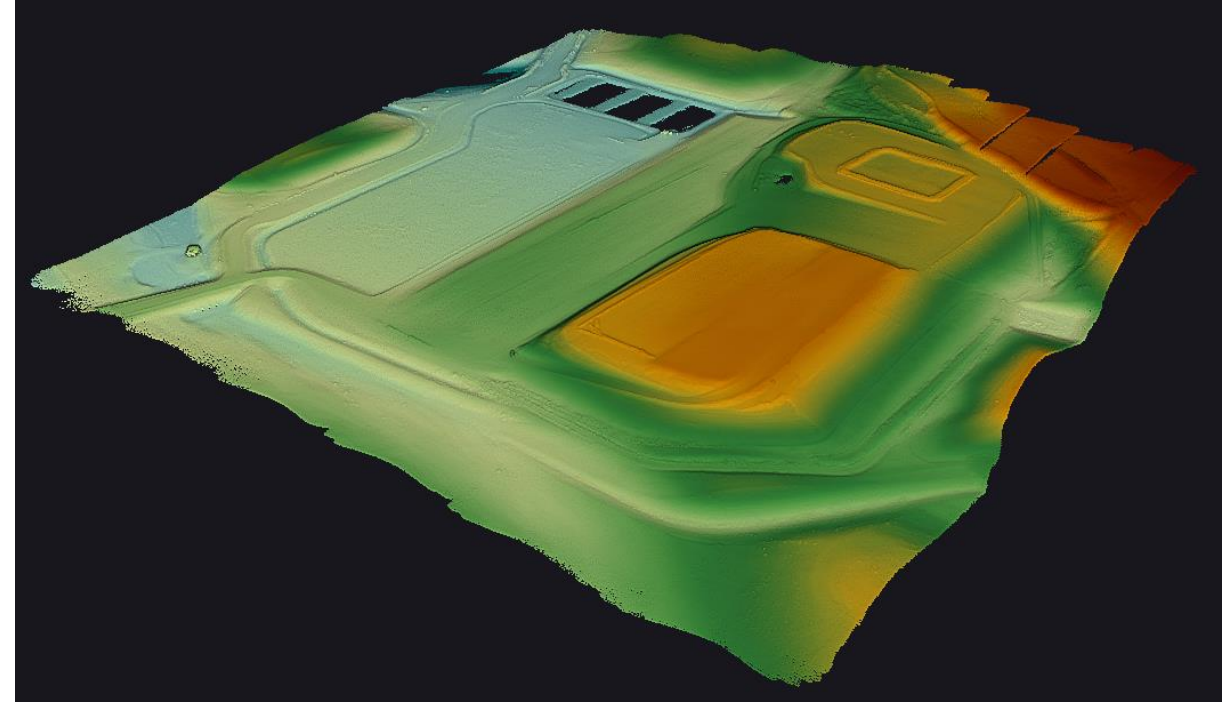
- Transmission systems
- Substations
- Facility locations
- Civil site plans

As-build Inspections

- Conductor sags
- Structure height and wire attachment height
- Correct pole placement
- Damage inventory
- Ground elevation verification
- Reclamation

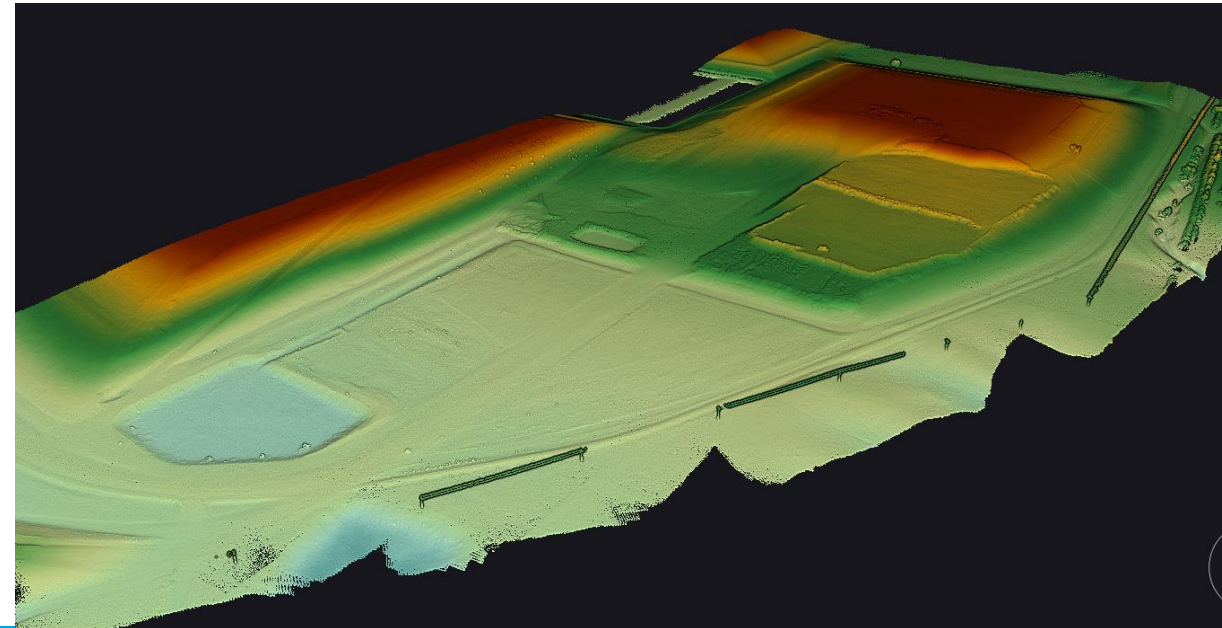
Dry Fork Station

Ash Landfill Volumetric Survey



Laramie River Station

Ash Landfill Volumetric Survey



Beyond Line-of-Sight

Beyond Line-of-Sight

- See and Avoid
 - Drones can't see and avoid
 - Restrict airspace
 - Keep drone within visual line-of-sight
- Sense and Avoid
 - Vantis network

Beyond Line-of-Sight

Vantis network and Operations Center

THE VANTIS NETWORK

REMOTE INFRASTRUCTURE

- Surveillance sensors
- Command and control radios



BACKHAUL DATA NETWORK

- High reliability, low latency
- Scalable



UNMANNED AIRCRAFT SYSTEM (UAS)

- Ground control station
- Aircraft



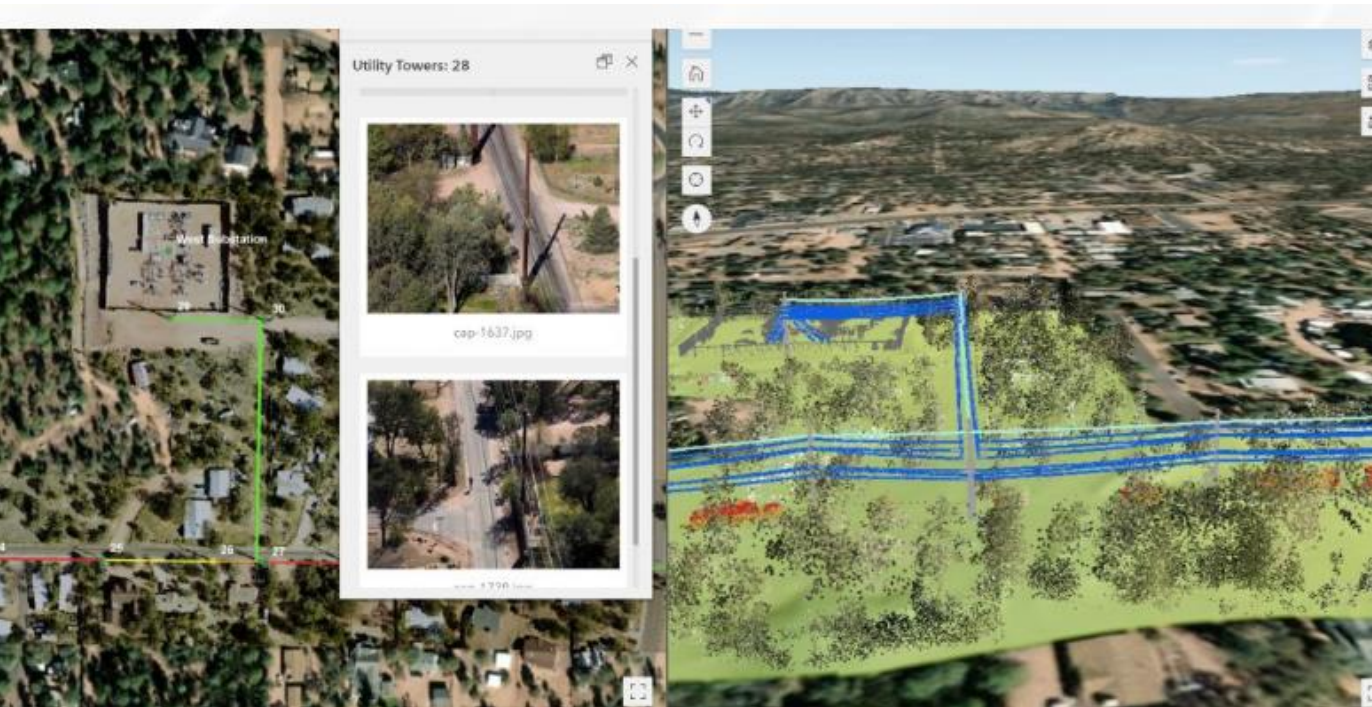
MISSION & NETWORK OPERATIONS CENTER

- Data correlation and validation
- Maintenance monitoring
- System testing



Beyond Line-of-Sight

- Preparing for the future
 - Take advantage of current technology
 - Camera system for line patrol



Emerging Drone Technology

Emerging Drone Technology

- Wind turbine blade inspections
- Solar panel inspections
 - Infrared
- Boiler inspections
- Bird nest survey
- Beginning of line patrol and beyond line-of-sight
 - Xcel Energy

Emerging Drone Technology

- Drone-in-a-Box
 - Permanently placed system
 - Programmable from anywhere
 - No need for person on-sight



Emerging Drone Technology

- Urban Air Mobility
 - Human carrying drones
 - Airbus, Joby, Uber



Questions